I claim:

1. A method to utilize the energy released by the molten aluminum-water reaction to do useful work by creating a dual explosion in a medium to which desired mechanical effects are to be created comprising the following steps:

a) placing in the presence of water a detonable or combustible explosive device in the said medium, the said explosive device being capable of producing aluminum in its molten state to react with water; and,

b) actuating the said explosive device to initiate the first of the said dual-explosion which is a detonation or combustion of the said explosive device, creating mechanical effects in the said medium and releasing aluminum in its molten state, wherein the molten aluminum then reacts with water to create a second explosion of the said dual-explosion, enhancing or modifying the mechanical effects created by the said first explosion.

2. The method of claim 1 wherein the said medium to which the desired mechanical effects are to be created include but is not limited to: water, rock stratum, concrete, steel casing or tubing in an oil or gas well, hydrocarbon bearing formation or coal seam, a target of any material to be attacked.

3. The method of claim 1 wherein the said mechanical effects in the said medium are the mechanical effects for which an explosive device is designed to achieve, which include but are not limited to, one or a combination of the following effects: pressure wave generation and

propagation, pressurization and displacement of medium, target penetration, piercing and fracturing, crack initialization and propagation, medium disintegration, fragmentation and fragment movement.

4. The method of claim 1 wherein aluminum is substituted with some other light metals or their alloys which also have a tendency to react with water in its molten state and release a substantial amount of thermal energy and hydrogen gas from the reaction, wherein such light metals and alloys include but are mot limited to: magnesium, aluminum-magnesium alloy, aluminum-lithium alloy, and zirconium.

5. A method to produce aluminum in molten state in the purpose to use the aluminum-water reaction to do useful work includes:

a) mixing a high explosive with aluminum and the content of aluminum is surplus in stoichiometry needed to react with all the detonation products of the said high explosive; and,

b) detonating the said high explosive/aluminum mixture and the said surplus aluminum is heated with detonation heat and the heat released from the reactions between the detonation products of the said high explosive with the stoichiometrical portion of aluminum.

6. The method of claim 5, wherein the said high explosive includes the explosives that are chemically compatible with aluminum which include but are not limited to: RDX (Hexogen, Cyclotrimethylenetrinitramine), HMX (Octogen,

Cyclotetramethylenetetranitramine), TNT (Trinitrotoluene), PETN (Pentaerythritol Tetranitrate), PYX, HNS, Ammonium Nitrate and Ammonium Nitrate based explosives such as ANFO (Ammonium Nitrate Fuel Oil), emulsion explosives and blasting agents.

7. A method to produce aluminum in molten state for using an aluminum-water reaction to do useful work comprising:

a) mixing an oxidizer with aluminum and the content of aluminum is surplus in stoichiometry to react with all the oxidizer;

b) igniting the said high oxidizer/aluminum mixture and the said surplus aluminum is heated with heat released from the reaction between the oxidizer with the stoichiometrical portion of aluminum.

8. The method of claim 7 wherein the said oxidizer is a metal oxide chemically compatible with aluminum till the mixture is actuated, which includes but is not limited to: copper oxide (CuO), cuprous oxide (Cu_2O), Ferrous oxide (FeO), Ferric Oxide (Fe_2O_3), Triiron Tetroxide (Fe_3O_4), Cobalt Oxide (Co_2O_3), Zinc Oxide (ZnO), Lead Oxide (PbO), Lead Dioxide (PbO_2), Lead Tetroxide (Pb_3O_4) and Manganese Oxide (MnO_2).

9. The method of claim 7 wherein the said oxidizer is an oxygen-rich reagent which is chemically compatible with aluminum till the mixture is actuated and can be used to mix a detonable or combustible mixture with aluminum, wherein such reagents include but are not limited to: nitrates like Sodium Nitrate ($NaNO_3$), Potassium Nitrate (KNO_3), Barium Nitrate ($Ba(NO_3)_2$, Ammounium Nitrate (NH_4NO_3); chlorates like Sodium Chlorate ($NaClO_3$),

Potassium Chlorate ($KClO_3$); perchlorates like Lithium Perchlorate ($LiClO_4$), Potassium Perchlorate ($KClO_4$), Strontium Perchlorate ($Sr(ClO_4)_2$) and Ammounium Perchlorate ($NH_4(ClO_4)$).

10. The method of claim 7 wherein the said oxidizer is a water or a water solution of oxygen-rich reagents which includes but is not limited to the water solution of : nitrates like Sodium Nitrate ($NaNO_3$), Potassium Nitrate (KNO_3), Barium Nitrate ($Ba(NO_3)_2$, Ammounium Nitrate (NH_4NO_3); chlorates like Sodium Chlorate ($NaClO_3$), Potassium Chlorate ($KClO_3$); perchlorates like Lithium Perchlorate ($LiClO_4$), Potassium Perchlorate ($KClO_4$), Strontium Perchlorate ($Sr(ClO_4)_2$) and Ammounium Perchlorate ($NH_4(ClO_4)$).